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Office of Irrigation Specialist
Electric Operations and Loans Division
Rural Electrification Administration

New Mexico 25 Luna
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Pump Irrigation Conclusions and Recommendations
Columbus Electric Cooperative, Inc.
Columbus, N. M.

Based upon an analysis of data available, the following conclusions and recommendations are made concerning the pump irrigation load now served or proposed to be served by the Columbus Electric Cooperative, Columbus, New Mexico.

CONCLUSIONS

1. A portion of the area served by the borrower in Luna and Hidalgo Counties is well adapted to pump irrigation. The major pump irrigation development is in the Mimbres Basin in the vicinity of Deming and in the Animas Basin. Two smaller areas, which as yet have not been declared and placed under control of the State Engineer where pump irrigation is developing is in the Rodeo and Rayas Valley Districts. There is a small area southeast of Lordsburg which may be opened up to homesteading and pump irrigation.

The area immediately around Deming has been closed several years for further well development. The Western Extension to the Mimbres Basin, commonly called the Red Mountain Area was opened for homesteads but drilling permits have been suspended for the present. The Franklin Area is also suspended for the present. The Columbus Basin is now suspended. The Animas Basin has been closed for further drilling permits.

There are a number of outstanding drilling permits in the several areas. The following table shows the number of wells in use and the number of outstanding drilling permits in the Service Area:



<u>Area and Substation</u>		<u>Wells In Use</u>	<u>Wells Completed</u>	<u>Outstanding Well Permits</u>
Deming Area	)	* 100	* 100	* 0
Western Extension or)			
Red Mountain Area	)	34	34	7
Franklin Area	)	20	44	33
)			
Columbus Basin and	)	50	49	168
Tres Hermanas Area)			
Animas Valley	)	136	140	4
Rodeo Area	)	30	30	Not required
Playas Valley	)	20	20	Not required
Totals		390	417	212

*The New Mexico Public Service Co. is serving 360 pumping plants within the area designated above as "Deming Area" "Mimbres Basin." In addition there are others in the "Deming Area" that are powered by internal combustion engines. It is likely that a few supplemental well permits will be allowed from time to time by the State Engineer and some conversion from internal combustion to electric power can be anticipated provided equitable electric rates are maintained.

2. Cotton has been and continues to be the major cash crop. With the establishment of cotton quotas, grain sorghums are being grown with success. Some alfalfa and pasture crops are being irrigated successfully. Feeding of livestock, cattle and sheep, is a practice that is increasing. According to the County Agent, the cotton crop was excellent, with the Luna County average at approximately 2 bales per acre. Some vegetables are grown with success; lettuce, onions, cabbage, carrots and potatoes; however, a stable market is not existent which makes vegetable growing a gamble.
3. The lowered agricultural economy is showing up in the area with farmers on newly developed farms experiencing the most difficulty, in that they are curtailed on sources and amount of credit for development of new land and regular farming operations. The result is that the cooperative has 56 pumps representing 1790 HP that are now idle. It is anticipated that 23 of the idle pumps will be reconnected for the 1955 irrigation season which will make a total of 275 estimated to be served during 1955.

The continued drouth has hurt the cattlemen particularly. With the drouth and low cattle prices, the economy of the farmer and rancher has been depressed. The rancher finds it difficult to pay fair prices for hay, grain, and other feeds needed to carry livestock because of drouth conditions.

4. The highly mineralized soils and well water in the northwestern part of the Animas Valley, the Columbus Basin and parts of the Franklin Area are of some concern to Federal and State representatives. The County Agents, SCS, FIA, and State Engineer representatives are of the opinion that leaching, fertilizing and chemical treatment of soils may have to be practiced to maintain profitable production.
5. Some competition to service of power for irrigation exists in that some pumps are being powered with natural gas (40 to 50 estimated in the service area adjacent to transcontinental gas lines and communities such as Rodeo). A few pumps are on diesel and gasoline while several are on butane. New Mexico Public Service Company is serving 360 pumps with electricity now and is adding a few from time to time. The farmers of the Animas Valley have talked of organizing a gas cooperative for their pumping plants if the electric rate increases are too great. In the Rodeo area, many of the pumps are powered with natural gas with the borrower serving only two pumps of a total of approximately 30. The two pumps served are in Cochise County, Arizona.
6. Records issued by the USGS District Office show that there is no alarming decline in the water table in any of the pumping districts served. The representatives of the State Engineer and USGS are of the opinion that the decline will decrease in rate as recovery of the ground water proceeds.
7. According to the State Engineer and the County Agent, land under irrigation in the service area is as follows:

Mimbres and Columbus Basin	30,600 ac.
Playas Valley	1,700 ac.
Animas Valley	11,000 ac.
Rodeo Area	2,000 ac.
Total	45,300 ac.

Considering the number of wells that have been completed but for one reason or another are not in use and considering the number of drilling permits that have not been used, there is a considerable potential for more land development. In addition to this, as previously mentioned, there are areas where homesteading may be allowed and irrigation developed. The limiting factor will apparently be the agricultural economy.

8. It was observed in making the survey that the borrower has some idle services to wells which were either never drilled

or were drilled and abandoned. Apparently contracts with members for service to irrigation either were not executed or were disregarded by the members. It appears that three-phase service was constructed to somewhat remote areas where there was only a promise of irrigation development and it did not materialize. In other areas cultivation has been temporarily suspended because of the lower economy, average allotments and the high cost of operation and development -- these areas may come back and be as productive as those that are now highly developed and that are producing over 2 bales of cotton to the acre or 2 tons of sorghum grain per acre.

Many economic factors are involved in the slowing down in development and load growth that was anticipated when the writer made an irrigation survey in 1952. The Von Glahn Farming interests of California and Western Cottonoil Co. invested hundreds of thousands of dollars in development in 1952 and 1953 with nothing to show for it at the present time.

9. It appears that one of the most important factors necessary in the success of the cooperative has been neglected and that is the promotion of a sound, aggressive power use program on irrigation, domestic and commercial loads.
10. Following is a tabulation showing the estimated irrigation load on each substation in two, five, and ten years:

ESTIMATE OF POTENTIAL IRRIGATION LOAD TO BE SERVED IN 2, 5, and 10 YEARS

January 1955

Substation Area	Present			Two Years			Five Years			Ten Years		
	No.	Av. HP	Total HP	No.	Av. HP	Total HP	No.	Av. HP	Total HP	No.	Av. HP	Total HP
Deming (Deming Area Sub- (Western Extension or Station) Red Mountain Area	37	32.5	1200	40	33	1320	40	34	1360	45	35	1575
	20	32.5	650	25	33	825	27	34	920	30	37	1110
Franklin Area Substation	24	34.5	825	30	35	1050	34	37	1260	40	40	1600
Columbus-Tres Hermanas Basin Substation	76	32.1	2440	80	33	2640	85	35	2980	100	37	3700
Animas (Animas Valley Sub- (Rodeo Area Station)(Hachita or Playas Vy.	95	36.7	3480	100	38	3800	115	40	4600	120	41	4920
	2	60	120	5	60	300	7	60	420	10	60	600
	21	21	440	27	22	595	30	25	750	35	28	980
TOTAL	* 275	33.2	9155	307	34.3	10,530	338	36.4	12,292	380	38.2	14,485

* This includes pumps that are now idle, but will likely be reconnected in next few months.

Estimate of Average Annual Kilowatt Hour Consumption

	Average KWH/HT	Average KWH/Installation
Two Year	1,500	51,450
Five Year	1,500	54,600
Ten Year	1,500	57,300

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This estimate is made by evaluating the information at hand. These quantities could easily be exceeded if there were a gain in the agricultural economy or they could be too high if the economy should decline any more.

Average consumption and revenue quantities per pumping unit and per horsepower, using representative pumps from each area in 1954, are listed below:

	<u>Revenue per Pump- ing Unit</u>	<u>Consumption per pump- ing Unit</u>	<u>Revenue per HP</u>	<u>Consumption per HP</u>	<u>Cost per KWH</u>
Unit I Columbus Area (7 pumps) Av. HP - 32.1	\$1,099.10	56,376	\$35.08	1,754	1.95¢
Unit II Deming Area (6 pumps) Av. HP - 32.5	\$1,192.45	42,580	\$36.69	1,310	2.8¢
Unit III Animas Area (6 pumps) Av. HP - 36.7	\$1,105.50	56,400	\$30.15	1,538	1.96¢
Unit IV Rodeo & Playas Area (9 pumps) AV. HP - 40.0	\$ 927.09	42,995	\$23.18	1,075	2.15¢

Note: The above pumps were selected as representative in horse-power and irrigation season. Only pumps which were operated for an entire season were used.

RECOMMENDATIONS

1. It appears that pump irrigation is on a fairly sound basis in most of the area served by the cooperative. This is borne out by the fact that farmers in the older, established districts, where sound farming practices are carried out, are making excellent crops and better than average return on their investment.

High cost of development and lower returns make it increasingly difficult for farmers in the newer areas to be successful unless adequately financed.

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It is recommended that each application for service to an irrigation installation be carefully studied before service is provided. This study should be made by the borrower's staff, assisted by the board, the County Agent, SCS, FHA, State Engineer, USGS and others acquainted with the area. Soils, water, farming experience, financing, etc. should be carefully considered.

2. Where the borrower has adequate substation and power line capacity located where minimum cost will be involved to serve sound pump irrigation facilities, such installations should be given priority in providing electric service. No extensions should be constructed until contracts with the members involved have been executed so that use of the electric energy by the member is assured. A definite extension policy should be established for long extension to serve irrigation installations.
3. As in the past, each loan application for providing service to irrigation installations should be studied and analyzed carefully.
4. The irrigation rate should be studied and careful consideration given to the possible competition from natural gas, also the fact that the farmers' margin continues to be reduced.
5. It is recommended that prior to making electric service available that the consumer be required to secure an adequate well test. This will provide proof of a satisfactory well and assurance that proper size pump and motor can be installed.
6. It is recommended that the consumer be required to sign a contract for a period of 3 to 5 years prior to construction of service for irrigation.
7. Should there be any doubt as to soundness of development from the standpoint of soils, water or the dependability of the farmer, it would appear wise to wait a few years before providing three-phase service; this would allow time for observation to insure soundness of the investment.
8. The cooperative staff should assist the consumers in the selection and maintenance of efficient pumping plants and irrigation systems by sponsoring, along with federal, state and local agricultural and technical organizations and representatives, training programs for groups and individuals. Conservation of soil, water, time, and human resources should be of top priority.
9. An aggressive promotional-sales (power use) program must be immediately established by the cooperative staff and board

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with an objective to increase beneficial use of power in domestic, irrigation and commercial categories. This is absolutely necessary to increase the revenue and to insure the solvency of the borrower.

10. Periodic system studies should be made so that load growth may be adequately served.



